chiefly of a continuation of his observations on the appearances of that body from the 2nd of March to the 3rd of May last.

Conceiving that there might be some advantage in getting rid of the darkening glasses in viewing the sun, he was led to substitute for them various liquors, such as spirits of wine, port wine, ink diluted with water, a solution of green vitriol with a small proportion of tincture of galls, and even plain water; which latter he found keeps off the heat so effectually, that the brightest sun may be viewed some time through it without any inconvenience.

Through diluted ink, the image of the sun appeared as white as snow; and when the liquor was still more diluted, the sun was of a purple hue, while the objects on its surface continued as distinct as when seen through any other medium. From these observations the author infers that the continuance of the symptoms which in his former paper he considered as favourable to the copious emission of light and heat from the sun, are sufficiently verified, and that by comparing these phænomena with the corresponding mildness of the season, his arguments respecting the connexion between them and the temperature of our atmosphere acquire no small degree of probability.

Being well aware that the price of wheat which he adopted in his former paper as a criterion of the seasons is liable to some objections, the author desires here to be understood, that his intention was merely to compare the astronomical fact of the variable emission of the sun's rays with the obvious symptoms corresponding with that circumstance; leaving it to others to apply the subject to such useful œconomical purposes as may be found to have any relation to them: at any rate, he cannot relinquish the hope that astronomy will ultimately supply us with the means of deriving certain prognostics of the temperature of the seasons from accurate observations on the quantity of the light we receive from the sun.

On an improved Reflecting Circle. *By* Joseph de Mendoza Rios, *Esq. F.R.S.* Read June 4, 1801. [*Phil. Trans.* 1801, *p.* 363.]

The great utility of Hadley's quadrant in practical astronomy, and particularly in navigation, has given rise to several improvements of that valuable instrument, of which some account is premised in the present paper. The first of these is due to the celebrated Tobias Meyer, who, by completing the limb of the sextant into a whole circle, and adding an horizon index, enabled us to repeat the observations, so as to ascertain the double, triple, and even a greater multiple of the angles; by which means the errors of division or eccentricity in the instrument can be reduced in the inverse ratio of the repetition of the observations, so as to arrive at any degree of approximation that may be required.

Some imperfection still remaining as to the manner of rendering the glasses parallel, so as to produce the exact coincidence of the images, the Chevalier de Borda contrived a method of rendering this exact parallelism of less consequence, by substituting the immediate

observation of the angular distance of the two objects to that of the coincidence of their images in one field. In his instrument the telescope is fixed at such a distance from the centre that the rays of light may arrive at the centre-glass both from the right and the left: double distances and cross observations are thus easily obtained, which essentially correct any imperfection in the construction of the instrument.

The peculiar advantages of these improvements being chiefly to afford the means of multiplying the observations of the distance required, Mr. Mendoza has directed his attention to some further improvements, which he thought might be deduced from the same principle. He accordingly favours us with an account of his new reflecting circle, of which a distinct idea can only be obtained by an inspection of the three accurate delineations which accompany his paper.

One of the additions is a compound handle, which facilitates the holding the instrument with the same ease in every direction. But the chief improvement appears to be a divided circle, moving round the centre, within, and close to the graduated limb, and capable of being alternately attached to each of the indexes. This the author calls the *Flying Nonius;* and shows how in every direction the two divisions may be made to exhibit the number of degrees on the limb, and of the minutes and seconds on the flying nonius. The manner in particular of making the crossed observations, by connecting the limb and the nonius alternately with the centre and horizon indexes, is here fully explained. And lastly, a small graduated semicircle is added to the horizon index, the use of which is to prepare the instrument previous to an observation, so as to facilitate the operation of bringing the images to coincide in the field of the telescope.

Observations and Experiments upon Dr. James's *Powder; with a Method of preparing, in the humid Way, a similar Substance. By* Richard Chenevix, *Esq. F.R.S. M.R.I.A.* Read June 4, 1801. [*Phil. Trans.* 1801, *p.* 375.]

From the experiments of Dr. Pearson on the nature of Dr. James's powder, published in the 81st volume of the Philosophical Transactions, our author infers that the mode in which it is prepared is far from being the best that the present improved state of chemical knowledge might afford; the use of fire in delicate processes, whether analytical or synthetical, being in general thought inferior to those performed in the humid way.

This powder, we are told, is prepared by mixing equal quantities of bone shavings (or phosphate of lime) and crude antimony, and calcining them together in an intense heat.

Here it is observed, that the portion of oxide of antimony, which is not volatilized in the process, becomes in a great measure insoluble in all acids. The humid process which Mr. Chenevix recommends as preferable to the above, consists in dissolving together or separately,